

The Identity of *Eriosoma querci* Fitch (Aphididae, Hom.).*

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The species of *Anoccia* upon *Cornus* in America has for many years been considered to be *corni* Fab., of Europe. While working over the species in 1909, the writer was convinced that the American form is distinct from the European. At that time he had no European specimens and was unable, therefore, to prove or disprove his suspicions excepting by literature. Since that time he has studied specimens from several localities in France, Germany, Belgium, Russia, the Madeira Islands and Japan. All of this material and a careful study of the European literature and the forms met with in this country have proven that the American form is quite a distinct species. It, however, winters upon plants of the same genus as does the European *corni* and migrates in summer to grass roots as does the European species. The Japanese form seems to agree with the European.

It will be seen by the accompanying figures that the fall migrants of the two species are quite different. The third segment of the antennae of *corni* is armed with twelve to nineteen sensoria and these are narrow, not subcircular, in shape. The average number in all the forms examined by the writer is between twelve and thirteen. Segments IV and V have from four to six similarly shaped sensoria. The fall migrant of the American species on the other hand has usually six or seven sensoria and these are oval or almost circular in shape, very different from the narrow elongate sensoria met with on *corni* antennae. Segments IV and V have two or three sensoria and these are oval or subcircular. The spring migrant of the American species shows two or perhaps three sensoria upon Segment III. These vary greatly in size. Sometimes they will be minute and sometimes there will be one large one and one small one. Again in other specimens some will be absent altogether. This also holds true of the sensoria upon Segment IV. The early summer alate of *corni* has about six or seven

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sensoria upon Segment III, and these are oval or sometimes almost subcircular like those upon Segment III of the American fall migrant.

Another thing which should be mentioned is the absence of

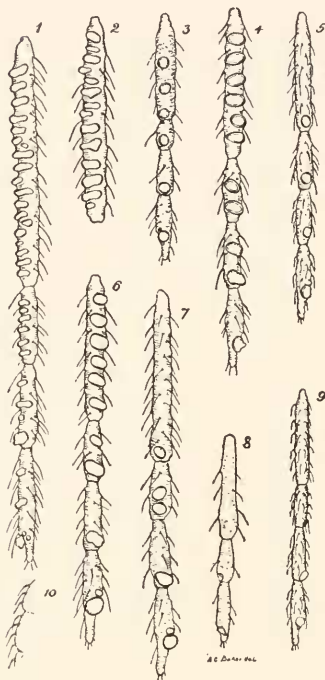


Fig. 1.—Antenna of Fall Migrant of *Anoecia corni* Fab.

Fig. 2.—Segment III of antenna of another specimen.

Fig. 3.—Antenna of Spring Migrant of *Anoecia querci* Fitch.

Fig. 4.—Antenna of Fall Migrant of *Anoecia querci* Fitch.

Fig. 5.—Antenna of Summer Aptera of *Anoecia querci* Fitch.

Fig. 6.—Antenna of Summer Alate of *Anoecia corni* Fab.

Fig. 7.—Antenna of Summer Aptera of *Anoecia corni* Fab.

Fig. 8.—Antenna of Stem mother of *Anoecia querci* Fitch.

Fig. 9.—Antenna of Summer Alate of *Anoecia querci* Fitch.

Fig. 10.—Margin of abdomen of Summer Aptera of *Anoecia querci* Fitch showing hairs.

the large quadrate patch on the abdomen of the spring migrant of the American form. In his description of the spring migrant of *corni* Koch (1857) does not mention this marking and his figure does not show it. The writer supposes, therefore, that it is absent from the spring migrant of *corni* also.

The writer has never seen European spring migrants and is therefore unable to give the number of sensoria. Judging from the American species and from the early summer form of *corni* he would suppose that it possessed about six or seven somewhat oval sensoria upon Segment III and in this way differs from the American form which possesses few sensoria.

Measurements of different forms of *corni* are here given for comparison with the descriptions of the American species also herewith included.

Fall Migrant.—

Segments of antenna: III, 0.464 to 0.512 mm.; IV, 0.16 to 0.176 mm.; V, 0.16 to 0.176 mm.; VI (0.144 to 0.176 mm. + 0.064 mm.)

Spring Aptera from Roots.—

Segments of antenna: III, 0.32 mm.; IV, 0.128 mm.; V, 0.128 mm.; VI (0.128 + 0.048 mm.).

Fall Apterous from Roots.—

Segments of antenna: III, 0.32 to 0.352 mm.; IV, 0.128 mm.; V, 0.128 mm.; VI (0.128 + 0.064 mm.).

Spring Alate from Roots.—

Segments of antennae: III, 0.32 mm.; IV, 0.128 mm.; V, 0.128 mm.; VI (0.128 + 0.048 mm.).

Since the American form proves to be distinct from *corni*, the correct name to apply to the species must be ascertained.

Two species were described by Walsh (1862). These two, *cornicola* and *fungicola*, are undoubtedly the same species as that common upon *Cornus*.

Fitch (1858) described *Eriosoma querci* from oak in Illinois, the description of which agrees fairly well with our *Anoecia* upon *Cornus*. His notes upon the species give the following collection numbers 7946-9 and 7950-1. Of these numbers 7948 was mounted from the Fitch collection by Mr. Theo. Pergande and deposited in the National Museum collection. The writer, in studying the Fitch collection, located also the numbers 7949, 7950 and 7951. These specimens were pinned and carried Fitch's labels. On mounting in balsam, all of the four specimens proved to agree with the species so common upon *Cornus*. *Anoecia querci* (Fitch), therefore, must be the name to apply to this species.

Cowen (1895) referred to *querci* Fitch a species found by him upon oak in Colorado. Later Davis (1911) gave a more complete description and figures of this same species and placed it in *Phyllaphis*. Davidson (1910) also recorded the insect from California. Gillette (1914) renamed Cowen's species *quercifoliae* and separated it from the eastern one. Specimens collected by the writer in Virginia prove that the insect referred to by Davis if not by Davidson is a very dis-

tinct species which may now be known as *Phyllaphis quercicola* n. n. It is, however, not a typical *Phyllaphis*.

While working at the Deciduous Fruit Insect Laboratory at Vienna, Virginia, the writer had the opportunity to observe the migrations of *querci* to and from *Cornus* shrubs. It is on the basis of these observations that the present paper showing the distinctness of *querci* has been written. The migration of the species from *Cornus* to grass roots was first pointed out by Osborn (1889) who placed *panicola* Thos. (1879) as a synonym of *corni* Fab. He took Oestlund (1887) as his authority for using the name *corni*, and therefore included *venusta* Pass. as a synonym of his summer form. Osborn was entirely right as far as his observations on the migration were concerned, although his presentation of the case has not been altogether followed by American writers. Recently Dr. Patch (1916) has pointed out this fact and made reference to the records (Mordwilko, 1907) of the migration of *corni* in Europe, which species she considered the same as the American. The writer believes that this retention of *panicola* Thos. is due to a lack of a sufficient knowledge of the variation of our *Cornus* species. As will be seen by the following descriptions and figures, the spring and fall migrants differ very much in antennal characters, and spring migrants vary greatly among themselves in regard to the sensoria of the antennae. The summer forms show other differences, the most important of which is the presence of prominent long curved hairs on the body. These, however, are present to some extent in the spring forms also. In some cases no sensoria are present on the third segment of the summer alate form and this might lead to its being considered a distinct species. A study of the different summer specimens has convinced the writer that *panicola* must become a synonym of *querci*. It might possibly be considered that the forms showing the prominent curved hairs are a distinct species and that the summer forms of *querci* though living upon grass roots would not show them. Since they are, however, indicated upon the spring forms there seems little doubt in the writer's mind that one species only is represented.

Thomas (l. c.) also described a species which he named *Rhizobius eleusinis*. In the Bureau collection there are specimens of this species reared by Mr. Pergande from the roots of *Eleusine indica* Gaertn. and determined by him as *eleusinis* Thos. These seem to agree in all important details with summer specimens of *querci* Fitch. The apterous forms agree well with the description given by Thomas. It seems evident then that *eleusinis* is a synonym of *querci*.

Wilson (1911) has recently described a species of *Anoecia* under the name of *oenotherae*. The principal differences between his species and *querci* are said to be the small sensoria on the antennal segments. These and the color are given as characters. As has been mentioned, the sensoria upon the spring and summer forms of *querci* vary greatly, sometimes being small and circular, sometimes large, sometimes absent altogether with the exception of the permanent ones. The color also shows considerable variation in the main body color, though the black lateral patches are usually about the same.

The writer is inclined, therefore to believe that *oenotherae* is only another of the root-feeding forms of *querci*, which in the particular case was feeding upon *Oenothera*. That the forms do not migrate in the regular way can hardly be taken as evidence of a distinct species. The writer has summer forms of *corni* taken on wheat roots in April and it was evident that two generations at least had already lived there. In the same way, summer specimens of *querci* can be found very late in the year upon the roots of various plants, much later than the usual migration period. The proportion of the segments seems, however, to be different in the measurements given by Wilson.

***Anoecia querci* (FITCH)**

Eriosoma querci Fitch

Rhizobius eleusinis Thos.

Schizoneura panicola Thos.

Anoecia corni, American authors.

?*Anoecia oenotherae* Wilson.

In the vicinity of Vienna, Virginia, the eggs of *Anoecia querci* hatch about the middle of April. By the end of the

month the stem mothers are mature and are producing the second generation practically all of which becomes alate. The spring migrants are in the pupal instar by about May 6. In another three or four days the migration commences and lasts until the fore part of June, a few insects becoming alate at a time. Alate forms as well as apterous are produced during the summer upon the roots of various grasses. Toward the last of September the return migration commences and extends almost to the end of October. The sexes are deposited as the alate forms arrive so that we have fresh migrants and nearly mature sexes upon the leaves at the same time. A few straggling migrants are on the trees even after the eggs are being laid. The eggs are not placed thickly upon the twigs and are many fewer than would be expected from the number of sexes present.

It may be mentioned that the writer was unable to rear this species on the flowering dogwood, but was able to get it to feed only upon the narrow-leaved dogwood which borders the streams.

Stem Mother.—Morphological characters:—Antennae composed of either six or five segments with the following measurements: I, 0.064 mm.; II, 0.064 mm.; III, 0.176 mm.; IV, 0.064 mm.; V, (0.08 + 0.032 mm.), or I, 0.064 mm.; II, 0.064 mm.; III, 0.112 mm.; IV, 0.048 mm.; V, 0.064 mm.; VI, (0.08 + 0.032 mm.). Segments armed with a few stout hairs. Eyes very small; labium short extending about to the second pair of coxae; body elongate oval, with scattered hairs, length, 1.76 mm.

Color Characters:—General color deep reddish brown, sometimes purplish or almost black. Antennae dusky; abdomen with broad transverse bands of black.

Spring Migrant.—Morphological characters:—Antennal segments as follows: I, 0.064 mm.; II, 0.064 mm.; III, 0.208 to 0.24 mm.; IV, 0.08 to 0.09 mm.; V, 0.096 to 0.112 mm.; VI, (0.08 to 0.096 + 0.048 mm.). Segments III to VI, covered with numerous imbrications composed of rows of minute points and armed with long hairs. Segment III, with 2 to 4 subcircular sensoria varying from fairly large to very minute in size. Segments IV and V with usually one sensorium each and segment VI, with one large and several small sensoria at the base of the unguis. Labium moderately long, reaching to or past the bases of the hind coxae. Length from vertex to tip of cauda about 1.7 mm.

Color Characters:—Head and thorax black; eyes deep reddish brown; antennae, legs and distal extremity of rostrum black or dusky; abdomen greenish orange or brownish green, with the cauda, anal and genital plates and a row of patches on either side of the abdomen dusky to black. No large black spot is present in the middle of the abdomen.

Summer Apterous:—Morphological characters:—Antennal segments as follows: I, 0.08 mm.; II, 0.08 mm.; III, 0.128 mm.; IV, 0.064 mm.; V, 0.08 mm.; VI (0.096 + 0.048 mm.). Segments with no sensoria excepting the usual ones, but with very many prominent hairs thickly covering all the segments. Labium extending about to the hind coxae; length from vertex to tip of cauda about 1.6 mm. Entire body covered with rather long somewhat curved hairs. Some specimens are considerably larger than the specimens measured.

Color Characters:—General color milky or pale yellowish and covered with a fine white powder. Abdomen with rows of small blackish markings along the sides and several broken dusky bands in the region of the cornicles. Antennae dusky.

Summer Alate:—Morphological characters:—Antennal segments as follows: I, 0.064 mm.; II, 0.064 mm.; III, 0.224 mm.; IV, 0.096 mm.; V, 0.112 mm.; VI, (0.08 + 0.033 mm.). Segment III, sometimes armed with two or three minute circular sensoria very much like the smaller sensoria upon the corresponding segment of the spring migrant; other sensoria normal. All segments armed with the prominent curved hairs similar to those of the apterous form. In some cases there are no sensoria present on segment III. Labium extending about to the hind coxae. Total length from vertex to cauda about 1.6 mm.; entire body covered with prominent curved hairs.

Color Characters:—Head, antennae and thorax black; abdomen whitish or pale yellowish with blackish transverse bands between the cornicles and with a large quadrate patch on dorsum. Lateral spots of the same color are present on the margins of the abdomen.

Fall Migrant.—This form and the sexes have been described by Weed (1888). Only the measurements of this form will, therefore, be given here.

Antennal Segments: I, 0.064 mm.; II, 0.032 mm.; III, 0.208 mm.; IV, 0.112 mm.; V, 0.128 mm.; VI (0.128 + 0.048 mm.). Segment III is armed with 6 to 7 subcircular sensoria; segments IV and V with usually 2 each and segment VI, with the usual large one and the small accessory ones. This form has the large quadrate patch upon the abdomen similar to that of *corni* Fab.

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Anoplura from Sea-Lions of the Pacific Ocean.

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The Anopluran parasites of the seals and their allies constitute a small family, the *Echinophthiriidae*, containing less than ten species, all of which are adapted by a thick coating of spines, or spines and scales, to the aquatic life of their hosts. Opportunities for the examination of these marine mammals are not common and consequently new records are of much interest. The present paper records one Anopluran species previously described and another that appears to be new, both taken from sea-lions of the Pacific coast.

Echinophthirius fluctus n. sp.

Two mature males, a mature female and many immature